No. VIII, appearing from Dakota, moved down the Missouri valley and disappeared over the Southwest without producing any serious disturbance.

Nos. IX and X. The low barometric readings at the Rocky Mountain stations on the 26th and 27th indicated the presence of a serious disturbance. On the 27th the pressure rapidly diminished from the Upper Mississippi valley westward, and on the 28th there appeared an extensive trough of low barometer, extending from Indian Territory northward over Minnesota and Manitoba, but being lowest over the latter and the Lower Missouri valley. Previous to this time it is probable there was one low barometer, which gradually developed into the two. From the chart it will be seen that No. IX, after separating into three distinct areas, finally disappeared in the Southern States and Ohio valley. In their movement across the country cloudy or rainy weather became quite general, except in the West Gulf States, Lower Lake region, Middle States and New England, with very serious and destructive storms. Heavy rains and high winds are reported from Iowa, Tennessee, Georgia, Louisiana, and no doubt occurred in all the Southern States.

No. XI was of minor importance, producing rain in Maine and the eastern British Provinces. It apparently united with No. X over the mouth of the St. Lawrence river.

Areas of high barometer.—Of the most marked, the *first* apparently extended itself southeastward, on the 2d and 3d, from Manitoba over the Lake region, and on the 4th and 5th over the Atlantic States. The *second*, following low barometer No. IV, first appeared over the Lake region, from Manitoba, on the 12th and 13th, where it remained nearly stationary until the 15th, and extended itself over the Middle States and to the East Atlantic coast on the 16th and 17th. On the 18th and 19th, the *third* gradually appeared over the Lower Lake region, Middle and South Atlantic States, which extended over the South Atlantic and East Gulf States on the 19th and 20th, and then slowly disappeared. The *fourth*, following low barometer No. VII, was felt over the Lake region on the 24th, moved over New England and the Middle States on the 25th, and disappeared on the 28th in advance of depressions Nos. IX, X and XI. On the 31st, the *fifth* moved southeastward over the Lake region, succeeding low barometers Nos. IX and X. The movement of these areas has been confined principally to the Lake region and the Atlantic States. They have been more prominent than heretofore for August, and have failed to reach the Southern and Western States, especially the Southwest and West, over which sections the barometer has continued low for longer periods than usual.

ATMOSPHERIC TEMPERATURE.

The curves, in red, upon chart No. II, are the mean isothermal lines for the month. The table, upon the same, gives the average mean temperatures of the different geographical districts for August of this year, as well as those for a number of years. Throughout the Atlantic States it has been the coolest August for many years, and is explained by the movement of the areas of high barometers, with north and east winds, over these districts. In the Gulf States and northward to Ohio, Indiana, Illinois, Iowa and Nebraska it has been an extremely hot month, especially betwen the 4th and 14th, the thermometer ranging from 100° as high as 114° for several days at a time. In that portion west of the Mississippi the extreme heat continued for several weeks, and the mean temperature ranged from 1° to 8° above the average. This hot weather is

intimately connected with and accounted for by the deficiency in atmospheric pressure, producing southerly winds. On the Pacific coast the mean temperature is 2.°2 below the average.

Frosts occurred on the 3d, 4th and 5th in New York and New Jersey; on the 7th in Massachusetts; on the 17th in New Hampshire; on the 23d, 24th, 25th, 26th, 27th and 28th in Connecticut, New York, Vermont, New Hampshire, Massachusetts and Maine.

PRECIPITATION.

Chart No. III illustrates the distribution of the rain-fall for the month. The districts in which there has been an excess or a deficiency is apparent from an examination of the table upon the same. The decided excess for New England is principally due to the very heavy rains on the southern coast, produced by low barometer No. II. The deficiency in the Lower Lake region and the Ohio valley gave rise to droughts during the latter part of the month. In the Gulf States the deficiency, with the heat, was sufficient in a great measure to injure the crops. From northern Texas northward to Nebraska and Iowa the extreme dryness, excessive heat and grasshoppers at many places destroyed all vegetation. On the Pacific coast the rain-fall has been about the average.

The number of days on which rain fell during the month averages: in New England, eight; in the Middle Atlantic States, nine; in the South Atlantic States, eleven; in the Gulf States, eight; in the Lower Lake region, five; in the Upper Lake region, nine; in the Ohio valley and Tennessee, eight; in the upper Mississippi valley, eleven; in the lower Missouri valley, nine; in Minnesota, fifteen.

Hail fell at Troy, N. Y., on the 2nd; on the "divide," between Denver and Colorado Springs, Colorado, as large as walnuts, on the 3d; at Jamestown, N. Y., on the 7th; at Indianapolis, Ind., on the 7th and 9th; at Spartanburg, S. C., Weldon and Mount Pleasant, N. C., on the 8th; at Greensboro, N. C., Rochester and Benton Centre, N. Y., on the 12th; at Lunenburg, Vt., on the 12th and 30th; at Mount Solon, Va., on the 21st; at Pomaria, S. C., on the 24th; at Castalian Springs, Tenn., on the 29th. On Pike's Peak, Colorado, rain, hail, sleet and snow fell frequently, and often during the same storm, in succession.

HUMIDITY.

The percentages of relative humidity for the various sections average as follows: on the Gulf and South Atlantic coasts, .73; on the New England coast, .74; on the New Jersey coast, .77; in the interior of the Middle States, .66; in the Lower Lake region, .65; in the Upper Lake region, .72; in the Ohio valley, Tennessee and the Mississippi valley, from Dubuque to Vicksburg, .60; in the Lower Missouri valley, .61; in Minnesota, .74; at the Rocky Mountain stations, (excepting Pikes's Peak,) .38.

WINDS.

The arrows upon chart No. II show the prevailing winds for the month. As usual, they are from the high towards the low barometer. It is most perceptible in the Mississippi valley and westward, where the barometric gradient is the steepest, and no effect from land and sea breezes. On the Atlantic coast the prevailing winds have been from the north and east. As the high winds and gales have accompanied the movement of low barometers, they are spoken of under that heading.

The average total atmospheric movement, independent of direction, has been as follows in the several districts: New England, 4,180 miles; Middle Atlantic coast, 7,360;